AMENDMENTS TO THE CLAIMS

The following is a complete, marked up listing of revised claims with a status identifier in parentheses, underlined text indicating insertions, and strikethrough and/or double-bracketed text indicating deletions.

LISTING OF CLAIMS

1. (PREVIOUSLY PRESENTED) An apparatus for inspecting an obstructed circumferential portion of a generally cylindrical object comprising:

a substantially vertical support;

a generally arcuate frame defining an opening;

a holding mechanism arranged on the frame for engaging a surface of the generally cylindrical object, thereby temporarily fixing the position of the frame adjacent the generally cylindrical object;

a connector, the connector arranged between a lower portion of the support and the frame, the connector allowing for pivotal movement of the frame about the support;

a carrier, the carrier being supported by the frame and moveable along a portion of the arc described by the frame; and

a sensor assembly arranged on the carrier and positioned adjacent a surface of the cylindrical object, the sensor assembly comprising a sensor head,

whereby movement of the carrier causes the sensor head to move over an arcuate portion of a surface of the cylindrical object.

2. (PREVIOUSLY PRESENTED) An apparatus for inspecting an obstructed circumferential portion of a generally cylindrical object according to claim 1, wherein:

the holding mechanism for temporarily fixing the position of the frame adjacent a generally cylindrical object is selected from a group consisting of:

first and second stand-off elements of substantially fixed length and orientation arranged so that contact between the stand-off elements and a surface of the cylindrical object cooperate to establish a generally coaxial orientation of the frame relative to the cylindrical object;

first and second adjustable stand-off elements wherein the length of the adjustable stand-off elements may be manually adjusted between a minimum length and a maximum length and are arranged so that contact between the adjustable stand-off elements and a surface of the cylindrical object cooperate to establish a generally coaxial orientation of the frame relative to the cylindrical object;

first and second piston elements arranged and configured to extend first and second pads to contact the surface of the cylindrical object, the piston elements being arranged so that compressive forces applied by the extended pads against a surface of the cylindrical object cooperate to establish a generally coaxial orientation of the frame relative to the cylindrical object,

first and second magnetic elements arranged and configured to extend first and second magnets to engage a ferrous surface of the cylindrical object, the magnetic elements being arranged and configured so that magnetic forces established between the extended magnets cooperate to establish a generally coaxial orientation of the frame relative to the cylindrical object, and

first and second vacuum elements arranged and configured to extend first and second vacuum elements to engage a surface of the cylindrical object, the vacuum elements being arranged and configured so that the pressure differential established between the extended vacuum elements and a surface of the cylindrical object cooperate to establish a generally coaxial orientation of the frame relative to the cylindrical object.

3. (ORIGINAL) An apparatus for inspecting an obstructed circumferential portion of a generally cylindrical object according to claim 1, wherein the sensor assembly further comprises:

a sensor actuator, the sensor actuator arranged and configured for fine movement of the sensor head relative to the carrier, the range of movement being sufficient to compensate for variations in positioning the carrier relative to the surface of the cylindrical object and thereby achieve a desired orientation of the sensor head and the surface of the cylindrical object.

4. (NOT ENTERED) An apparatus for inspecting an obstructed circumferential portion of a generally cylindrical object according to claim 1, wherein:

the frame and the carrier are characterized by generally similar arcuate lengths;

the carrier being arranged and configured for movement between a first position and a second position relative to the frame, and further wherein

in moving to the first position, a first end portion of the carrier moves in a generally arcuate path that extends substantially beyond a corresponding first end of the frame and

in moving to the second position, a second end portion of the carrier moves in a generally arcuate path that extends substantially beyond a corresponding second end of the frame.

5. (ORIGINAL) An apparatus for inspecting an obstructed circumferential portion of a generally cylindrical object according to claim 4, wherein:

a first sensor is arranged adjacent the first end portion of the carrier and a second sensor is arranged adjacent the second end portion of the carrier; and further wherein

the first sensor tracks across a first scanned portion of the surface of the cylindrical object as the carrier moves between the first position and the second position and

the second sensor tracks across a second scanned portion of the surface of the cylindrical object as the carrier moved between the first position and the second position.

6. (ORIGINAL) An apparatus for inspecting an obstructed circumferential portion of a generally cylindrical object according to claim 5, wherein:

the first scanned portion comprises at least about 180° of the surface of the cylindrical object and

the second scanned portion comprises at least about 180° of the surface of the cylindrical object, whereby

the combination of the first and second scanned portions substantially defines a single annular portion of the surface of the cylindrical object.

7. (PREVIOUSLY PRESENTED) An apparatus for inspecting an obstructed circumferential portion of a generally cylindrical object according to claim 1, wherein:

the obstructed circumferential portion of the cylindrical object comprises an annular recess, the recess having an inner surface and an outer surface and being characterized by a depth to width ratio of at least 4; and

the sensor head is positioned adjacent a scanned surface within the recess during the arcuate movement of the carrier, the relative position of the sensor head and the scanned surface being characterized by a target separation distance.

8. (PREVIOUSLY PRESENTED) An apparatus for inspecting an obstructed circumferential portion of a generally cylindrical object according to claim 7, wherein:

the sensor assembly being capable of adjusting the position of the sensor head relative to the carrier during carrier movement to maintain the target separation distance within predetermined limits.

9. (PREVIOUSLY PRESENTED) An apparatus for inspecting an obstructed circumferential portion of a generally cylindrical object according to claim 8, further comprising:

a controller for automatically adjusting the position of the sensor head relative to the carrier during carrier movement to maintain the target separation distance within predetermined limits.

10. (PREVIOUSLY PRESENTED) An apparatus for inspecting an obstructed circumferential portion of a generally cylindrical object according to claim 3, further comprising:

a sensor actuator, the sensor actuator arranged and configured for gross movement of the sensor relative to the carrier, the range of movement being sufficient to position the sensor adjacent two distinct circumferential portions of the surface of the cylindrical object without requiring any repositioning of the frame.

11. (ORIGINAL) An apparatus for inspecting an obstructed circumferential portion of a generally cylindrical object according to claim 1, further comprising:

first and second frame end portions, the frame end portions being moveable with respect to an arcuate base frame portion,

the frame end portions being moveable between a first position that defines a maximum width of the opening and a second position that extends the arcuate path defined by the arcuate base frame portion.

12. (CURRENTLY AMENDED) A method of inspecting an obstructed circumferential portion of a generally cylindrical object using an apparatus comprising a support, a generally arcuate frame, a holding mechanism for temporarily fixing the frame to the generally cylindrical object, a connector, a carrier supported by the frame, and a sensor assembly comprising a sensor arranged on the carrier, the method comprising the steps of:

orienting a longitudinal axis of the support generally parallel to a longitudinal axis of the cylindrical object;

positioning the frame and carrier for movement;

positioning the support so that a lower portion of the support is generally perpendicular to a portion of the generally cylindrical object to be scanned;

positioning the frame in a measurement orientation in which the frame is generally perpendicular to the support and partially surrounds a portion of the generally cylindrical object;

engaging the holding mechanism to contact a portion of a surface of the generally cylindrical object and thereby establish a first position of the frame relative to and partially surrounding the generally cylindrical object;

positioning the sensor adjacent an obstructed portion of the generally cylindrical object, wherein the obstructed portion may not be surrounded by any portion of the frame;

moving the carrier in a generally arcuate path, thereby moving the sensor along a circumferential portion of the obstructed portion of the generally cylindrical object to define a scanned surface portion; and

sensing a property of the generally cylindrical object adjacent the scanned surface portion.

13. (PREVIOUSLY PRESENTED) A method of inspecting an obstructed circumferential portion of a generally cylindrical object according to claim 12, further comprising the steps of:

releasing the holding mechanism; and

removing the apparatus from the vicinity of the generally cylindrical object.

14. (CURRENTLY AMENDED) A method of inspecting an obstructed circumferential portion of a generally cylindrical object according to claim 12, further comprising the steps of:

releasing the holding mechanism;

repositioning the frame relative to the generally cylindrical object; and

re-engaging the holding mechanism to contact a second portion of a surface of the generally cylindrical object and thereby establish a second position of the frame relative to the generally cylindrical object.

15. (PREVIOUSLY PRESENTED) A method of inspecting an obstructed circumferential portion of a generally cylindrical object according to claim 12, further comprising the steps of:

generating a signal corresponding to a value of the property being sensed; and

communicating the signal to a receiver.

16. (PREVIOUSLY PRESENTED) A method of inspecting an obstructed circumferential portion of a generally cylindrical object according to claim 12, wherein the step of moving the carrier in a generally arcuate path further comprises the steps of:

positioning the carrier at an initial position within the frame, the initial position being one in which the carrier is positioned substantially within frame;

moving the carrier at least about 90° along the arcuate path in a first direction, the movement terminating at a first extended position; and

moving the carrier at least about 180° along the arcuate path in a second direction, the second direction being the direction opposite the first direction, the movement terminating at a second extended position.

17. (PREVIOUSLY PRESENTED) A method of inspecting an obstructed circumferential portion of a generally cylindrical object according to claim 16, wherein the step of moving the carrier in a generally arcuate path further comprises the step of:

moving the carrier at least about 90° along the arcuate path in a first direction, the movement terminating with the carrier in approximately the initial position.

18. (PREVIOUSLY PRESENTED) A method of inspecting an obstructed circumferential portion of a generally cylindrical object according to claim 12, wherein the step of preparing the frame and carrier for movement further comprises the steps of:

positioning the carrier at an initial position, the initial position being one in which the carrier is positioned substantially within the frame; and

positioning the frame at a deflected position relative to the support, the deflected position reducing an effective width of the frame in a direction perpendicular to a longitudinal axis of the support.

19. (PREVIOUSLY PRESENTED) A method of inspecting an obstructed circumferential portion of a generally cylindrical object according to claim 18, wherein the step of preparing the frame and carrier for movement further comprises the step of:

positioning the sensor heads in a protected orientation to reduce the likelihood of contact with an obstruction during steps of positioning the support and positioning the frame.

20. (ORIGINAL) A method of inspecting an obstructed circumferential portion of a generally cylindrical object using an apparatus comprising a support, a generally arcuate frame comprising a base portion and first and second end portions, a holding mechanism for temporarily fixing the frame to the generally cylindrical object, a connector, a carrier supported by the frame, and a sensor assembly comprising a sensor arranged on the carrier, the method comprising the steps of:

orienting a longitudinal axis of the support generally parallel to a longitudinal axis of the cylindrical object;

positioning the frame and carrier for movement, wherein the frame end portions are moved relative to the frame base portion to form an enlarged opening;

positioning the support so that a lower portion of the support is generally perpendicular to a portion of the generally cylindrical object to be scanned;

positioning the frame in a measurement orientation in which the frame is generally perpendicular to the support and partially surrounds a portion of the generally cylindrical object, and further wherein the frame end portions are moved relative to the frame base portion to reduce the enlarged opening and complete the arcuate frame;

engaging the holding mechanism to establish a first position of the frame relative to the generally cylindrical object;

positioning the sensor adjacent an obstructed portion of the generally cylindrical object;

moving the carrier in a generally arcuate path, thereby moving the sensor along a circumferential portion of the obstructed portion of the generally cylindrical object to define a scanned surface portion; and

sensing a property of the generally cylindrical object adjacent the scanned surface portion.

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